



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,291	12/09/2003	Ke Liu	C-2775AHyS	4920
7590	03/24/2006		EXAMINER	
M. P. Williams 210 Main Street Manchester, CT 06040			PATEL, VINIT H	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/731,291	LIU ET AL.
	Examiner	Art Unit
	Vinit H. Patel	1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 26 August 2005.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-13 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-13 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____

5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on August 26, 2005, has been entered.

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1 and 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Louder et al. (USP 3,898,153).

Regarding claim 1, Louder et al. discloses a method for providing desulfurized hydrocarbon feed comprising: producing hydrogen-rich reformate (12, 14) from undesulfurized hydrocarbon feed (6) in a small hydrogen generator (9); feeding said hydrogen-rich reformate (12, 14) along with the undesulfurized hydrocarbon feed (4) to a hydrogen desulfurizer (5) (Fig. 1).

Regarding claim 3, Louder et al. discloses an apparatus for providing desulfurized hydrocarbon feed comprising: means (9) including a small hydrogen generator for producing hydrogen-rich reformate (12, 14) from undesulfurized

hydrocarbon feed (6); a hydrogen desulfurizer (5); means (14) for feeding said hydrogen-rich reformate (12, 14) along with the undesulfurized hydrocarbon feed (4) to said hydrogen desulfurizer (5) (Fig. 1).

Regarding claim 4, Louder et al. discloses a system for desulfurizing hydrocarbon feeds comprising: a small hydrogen generator (9) receiving undesulfurized hydrocarbon feed (6) and providing hydrogen containing reformate gas (12, 14); a hydrogen desulfurizer (5) receiving said undesulfurized hydrocarbon feed (4) and receiving said hydrogen containing reformate gas (12, 14) from small hydrogen generator (9) (Fig. 1).

Regarding claim 4, while Louder et al. does not explicitly disclose a source of the undesulfurized hydrocarbon feed, the presence of said source is inherent in the system of Louder et al. (See Fig. 1).

3. Claims 9-10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Buswell et al. (USP 5,360,679).

Regarding claim 9-10 and 12, Buswell et al. discloses a system for producing hydrogen-rich reformate comprising: a source of undesulfurized hydrocarbon feed (0); a source of humidified air (Fig. 1, ref. 0, and C7/L43-65); a source of water (192); a small hydrogen generator (154) receiving undesulfurized hydrocarbon feed from said source (0) of undesulfurized hydrocarbon feed to produce a first stream of hydrogen-containing reformate gas (stream leaving said generator 154); a hydrogen desulfurizer (158) receiving undesulfurized hydrocarbon feed from said source (stream leaving said generator 154) of undesulfurized hydrocarbon feed and receiving said first stream of

hydrogen-containing gas (stream leaving said generator 154) from said small hydrogen generator (154) and providing a desulfurized hydrocarbon feed (2); a fuel processor including a reformer (168) receiving said desulfurized hydrocarbon feed (2) and said humidified air (2) and producing a second stream of hydrogen-containing reformat (8), a water gas shift reactor (172) receiving said second stream of hydrogen-containing reformat (8) and said water and feeding the resultant gas (12) into a preferential CO oxidizer (142) for producing a third stream of hydrogen-containing reformat (13) for use as fuel (abstract); wherein said small hydrogen generator (154) receives said humidified air (Fig. 1, ref. 0, and C7/L43-65) to produce said first stream of reformat gas from said undesulfurized hydrocarbon feed and said air; wherein said small hydrogen generator is a mini POX (C7/L43-65).

Regarding limitations recited in claims 9-10 and 12 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Such limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 2 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Louder et al. (USP 3,898,153) in view of Hershkowitz et al. (USP 5,883,138).

Regarding claims 2 and 5-8, Louder et al. discloses all of the claim limitations as set forth above. Additionally, while the reference discloses that said small hydrogen generator comprises a reformer (see abstract), the reference does not explicitly disclose said small hydrogen generator comprising a catalytic or non-catalytic partial oxidizer or an autothermal reformer, nor does it disclose a humidified air being feed to said small hydrogen generator.

Hershkowitz et al. establishes equivalency of various processes which can be used for hydrogen generation, including ATR, CPO and POX (C1/L5-C4/L35). The reference also teaches that each of the processes has advantages and disadvantages over each other (C1/L49-C4/L35). As instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the mini-ATR or mini-CPO or mini-POX for the small hydrogen generator of Louder et al., since such modification would have involved a mere substitution of known equivalent structures. A substitution of known equivalent structures is generally recognized as being within the level of ordinary skill in the art. Further, it would have been obvious to one having ordinary skill in the art at the time of the invention to select one of the known means for hydrogen production, as disclosed by Hershkowitz et al., and substitute them for the reformer of Louder et al., for the purpose of obtaining specific benefits and advantages associated with said selected hydrogen production means. The examiner notes, that once a reformer of Louder et al.

is replaced with ATR it will require a humidified air (see Hershkowitz et al., C1/L65-C2/L33).

6. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buswell et al. (USP 5,360,679) in view of Hershkowitz et al. (USP 5,883,138).

Regarding claims 11 and 13, Buswell et al. discloses all of the claim limitations as set forth above, but the reference does not explicitly disclose said small hydrogen generator comprising a catalytic partial oxidizer or an autothermal reformer.

Hershkowitz et al. establishes equivalency of various processes which can be used for hydrogen generation, including ATR, CPO and POX (C1/L5-C4/L35). The reference also teaches that each of the processes has advantages and disadvantages over each other (C1/L49-C4/L35). As instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the mini-ATR or mini-CPO or mini-POX for the small hydrogen generator of Louder et al., since such modification would have involved a mere substitution of known equivalent structures. A substitution of known equivalent structures is generally recognized as being within the level of ordinary skill in the art. Further, it would have been obvious to one having ordinary skill in the art at the time of the invention to select one of the known means for hydrogen production, as disclosed by Hershkowitz et al., and substitute them for the reformer of Louder et al., for the purpose of obtaining specific benefits and advantages associated with said selected hydrogen production means. The examiner notes, that once a reformer of Louder et al.

is replaced with ATR it will require a humidified air (see Hershkowitz et al., C1/L65-C2/L33).

Response to Arguments

Applicant's arguments filed August 26, 2005, have been fully considered but they are not persuasive.

Applicant argues that Louder et al. does not anticipate claims 1, 3 and 4 because the desulfurization bed 5 when located downstream of the reformer, then only desulfurized reformate would be fed to the desulfurization bed 5. Examiner respectfully disagrees. Louder discloses that hydrogen-rich reformate from undesulfurized hydrocarbon (interpreted as containing sulfur compounds) is produced in a small hydrogen generator and fed to desulfurization bed. Both reformate and undesulfurized feed would be sent to the desulfurizer bed 5 (Fig. 1), and therefore it anticipates the claims.

Applicant argues that Buswell et al. does not anticipate claims 9, 10 and 12 because element 154 is not a hydrogen generator. However, the examiner disagrees. The element 154, in use, has a source of humidified oxygen added to the propane, which under conditions of normal operation of the apparatus, will necessarily produce some hydrogen, therefore element 154 is considered to be a hydrogen generator, and therefore the recited claims are not differentiated from the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinit H. Patel whose telephone number is (571) 272-0856. The examiner can normally be reached on 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Calderola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


VHP


Glenn Calderola
Supervisory Patent Examiner
Technology Center 1700